

AN AUXILIARY UNIT FOR THE SANITISING TREATMENT OF DENTAL EQUIPMENT

BACKGROUND OF THE INVENTION

The present invention relates to an auxiliary unit for sanitising dental equipment, such as dental units.

5 At present, in the manufacturing of dental equipment it is almost normal practice to structure the water system, that is to say the circuits designed to allow the supply of fluids used by dental equipment and patients (water or physiological saline for tumblers and handpieces), or consumer units (swilling water for the spittoon) with sterilisation / disinfection systems of these circuits.

10 With increases in general standards of hygiene and with dental apparatus and equipment becoming more and more "fragile", several design solutions have in fact been found for the water and air circuits of dental units, not only to guarantee their efficient operation and durability but also to maintain the sterility of the conduits both during and between
15 patient treatments.

At present, the structure of these water circuits comprises a first main line supplying water from the mains, and a second main line supplying air from an external source (compressor) for the pneumatic circuit of the dental unit. Each of these circuits has a plurality of branches leading to the
20 above-mentioned operating and accessory equipment fitted with control valve means for the supply of pressurised fluids.

As already mentioned various systems have been designed on the basis of different methods aimed at improving the functioning and disinfection of these fluid lines or parts of them.

By way of an example, the Applicant designed a so-called "total hygiene" system, see patent EP 734.692, where the structure of the circuits is rationally designed within the construction project of the dental unit and already includes all the solutions which over time have been invented in order to obtain both maximum hygiene in the circuits and a real and complete isothermicity and isotonicity of the fluids which they supply to the instruments.

In practice this type of dental unit is already equipped to obtain disinfection / sterilisation cycles on the water circuit; in other words, all the components are built into the body of the dental unit.

However, due to problems regarding structure, dimensioning, final cost, area of application and design type, some dental units are not equipped with this dedicated system for disinfection / sterilisation and it does not at present appear to be possible to fit them with a practical and rational structure which does not substantially interfere in the construction context of the existing circuits.

The aim of the present invention is, therefore, to create an auxiliary unit for sanitising dental equipment and that can be applied to units not equipped with such systems quickly, rationally, with limited structural variations and with extremely limited overall dimensions.

SUMMARY OF THE INVENTION

This aim is achieved by means of an auxiliary sanitising unit applicable on dental equipment comprising a fluid supply line connected at one end to water mains and at the other end to the equipment by means of a first branch which supplies a series of instruments—patient, and an air

supply line connected at its infeed to a source of compressed air and at its
outfeed to the equipment; the auxiliary unit comprises a body, external to
the dental unit, supporting at least one container of disinfectant / sterilising
fluid which can be connected, by means of a first conduit, to the fluid
5 supply line; second means of interception positioned along the fluid supply
line and designed to allow closure of the instrument fluid supply at least in
the first branch during the sanitising treatment using the disinfectant /
sterilising fluid, and means for preparing and implementing the sanitising
treatment, acting at least on the first conduit and on the second
10 interception means, so as to allow the sanitising fluid to pass through the
first branch.

BRIEF DESCRIPTION OF THE DRAWINGS

The technical features of the invention, with reference to the above
15 aims, are clearly described in the claims below and its advantages are
apparent from the detailed description which follows, with reference to the
accompanying drawings which illustrate a preferred embodiment of the
invention provided merely by way of example without restricting the scope
of the inventive concept, and in which:

20 Figure 1 shows a front schematic view, with some parts removed to
show others better, of part of a dental unit on which the auxiliary unit
according to the present invention is applied.

Figure 2 shows a diagram of the circuit of an auxiliary unit according
to this invention and of part of the equipment that can be connected to the
25 auxiliary unit.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the accompanying drawings, and with particular reference to figure 1, the auxiliary sanitising unit, labelled 100, is fitted on dental equipment, such as for example, dental units R, of which only a part is shown in figure 1.

In particular, this unit 100 is especially indicated for dental units R not equipped from the outset with systems for disinfection / sterilisation of the water circuits.

According to what is shown in the circuit diagram in figure 2, these dental units R comprise:

- a fluid supply line 1 connected, at one end, to the general water mains 2 and, at the other, to the dental unit R by means of a first branch 3 which supplies a series of instruments—patient 4 comprising a plurality of handpieces (shown here schematically, since they are not strictly part of the invention);

- each of the handpieces 4 is equipped with first means 5 for intercepting the fluid so as to allow its supply, when required, in other words a control valve positioned on the handpiece;

- an air supply line 6, connected at its infeed to a source 7 of compressed air (for example a known compressor) and at its outfeed to a circuit of the dental unit R (not shown here).

In particular, a syringe 4s can be included in the plurality of handpieces 4 present on the first branch 3 supplying fluid.

This dental unit R can be connected to the auxiliary unit 100 which essentially comprises (see figures 1 and 2):

- a body 8, outside the dental unit R, supporting at least one

container 9 of disinfectant / sterilising fluid which can be connected, by means of a first conduit 10, to the fluid supply line 1;

- second means 11 of interception positioned along the fluid supply line 1 and designed to allow closure of the instrument fluid supply at least in the first branch 3 during the sanitising treatment using the disinfectant / sterilising fluid;

- means 12 and 13 for preparing and implementing the sanitising treatment, acting at least on the first conduit 10 and on the second interception means 11, to allow the sanitising fluid to pass through the first branch 3.

More specifically, the support body 8 can consist of a protective guard 8c inside which the said elements are arranged and applied, in addition to protecting the conduit sections connecting the container 9 and dental unit R.

According to what is shown in figure 2, the preparing and implementing means 12 and 13 are positioned along a second air supply conduit 14 connected to the air supply line 6, and housed in the support body 8.

These preparing and implementing means 12 and 13 act on the second means 11 of interception, and on third means 15 of interception positioned on the first conduit 10 and housed in the support body 8.

In more detail, see figure 2 again, these preparing and implementing means 12 and 13 are divided and positioned in two separate areas of the second air supply conduit 14: the preparation means 12 are close to the connection between the second conduit 14 and the air supply line 6, so as to allow the activation of the second and third means 11 and 15 of

interception positioned on the first conduit 10; the implementation means 13 are positioned on the second conduit 14 and close to fourth means 16 of interception, acting on the first branch 3 of fluid supply to the handpieces 4.

5 At a structural level, the preparation means 12 can consist of a first valve 12v with two positions, respectively, for closure of a connection between the air supply line 6 and the second conduit 14, and a position connecting the air supply line 6 and the second conduit 14 (the position shown in figure 2).

10 This valve 12v can be controlled by means of a relative lever 12a positioned on the outside of the support body 8 (see figure 1).

 The second air conduit 14 also has two branches 14a and 14b connecting it to the second and third means 11 and 15 of interception positioned on the first conduit 10: in this way the flow of air allows the
15 second and third means 11 and 15 of interception to switch to the appropriate configuration for the passage of disinfectant / sterilising fluid, that is to say the second means 11 in the closing position and the third means 15 in the opening position (as can be seen in figure 2).

 The second air conduit 14 leads to the container 9 of disinfectant /
20 sterilising fluid so as to allow a flow of disinfectant / sterilising fluid in the first conduit 10 at the connecting position of the first valve 12v.

 The implementation means 13 consist of a pneumatically controlled second valve 13v acting on the fourth means 16 of interception consisting
25 of a third fluid passage valve 16v positioned on a second branch 21 connecting the first branch 3 supplying the syringe 4s to the branches connecting the remaining handpieces 4 so as to allow the flow of

disinfectant / sterilising fluid on programmed activation of the unit 100.

The valve 13v may be controlled by an appropriate pushbutton 13a positioned on the support body 8.

5 By way of example, the outlet of the second branch 21 for the passage of the disinfectant / sterilising fluid can be situated upstream of the first means 5 of interception positioned on the respective handpieces 4 with respect to the fluid flow direction F.

10 Timer means 22 can act on the third interception valve 16v to allow programming of the sanitising treatment time, that is to say activation of the flow of disinfectant / sterilising fluid in the first branch 3.

These timer means 22 can also comprise an adjustment knob 22a positioned on the support body 8 and controllable by the operator.

15 The number 23 in figure 2 indicates means for adjusting the passage of air at the pneumatically controlled second valve 13v, designed to allow the discharge of the air circulating in the area of the second air conduit 14, close to said second valve 13v at the end of the treatment, that is to say on closure of the first valve 12v.

20 Upstream of the container 9 of disinfectant / sterilising fluid the second air conduit 14 can be equipped with an air filtering unit 17 so as to make the air entering the container 9 as sterile as possible.

In addition to the hygiene control of the air entering the container 9, the second air conduit 14 can be equipped with a means 18 for reducing the pressure of the air so as to allow a controlled flow of the air in the fluid container 9.

25 In combination with this reduction means 18, the second conduit 14 can also be equipped with a safety air outlet 19 designed to allow the

discharge of the air in the closed position of the connection between the air supply line 6 and the second conduit 14.

A further safety addition can be to apply a device 20 on the second conduit 14 to measure and display the pressure in the second conduit 14.

5 A check valve 24 can be fitted between the second and third means 11 and 15 of interception in order to prevent a flow of fluid towards the container 9 of disinfectant / sterilising fluid at the end of the treatment.

10 In practice, the unit 100 described above is applied to dental units R not fitted at the outset with systems for the disinfection / sterilisation of the water circuits.

Application is carried out by positioning the support body 8 close to the dental unit R and, subsequently, attaching the seconds means 11 of interception to the fluid supply line 1, while the preparation means 12 are connected to the air supply line 6 and the container 9 and the third means 15 of interception are connected to the fluid supply branch 3.

The second branch 21 and the relative fourth means 16 of interception are then connected to the first fluid supply branch 3.

20 The unit 100 is at this point ready to be used and the operator or the dentist can thus start the flow of disinfectant / sterilising fluid inside the branch 3 by operating the lever 12a which activates the valve 12v and allows the flow of air inside the second conduit 14.

25 This flow causes the closure of the second means 11 and the opening of the third means 15 with a consequent interruption of the water supply to the instruments and subsequent supply of disinfectant / sterilising fluid from the container 9 towards the branch 3 (see arrows F).

The operator or the dentist can select the treatment time by turning

the knob 22a which adjusts the timer means 22 situated on the support body 8 and then press the pushbutton 13a which activates the second valve 13v that allows air to flow towards the fourth means 16 positioned on the second fluid supply branch 21.

5 Opening of the third valve 16v causes the disinfectant / sterilising fluid to pass into the second branch 21 and thus towards the handpieces 4.

10 To simplify the description only the instrument handpieces 4 are considered, although the second branch 21 can supply other devices of the dental unit, not shown here, such as the spittoon or the rinsing tumbler, without limiting the invention.

The auxiliary unit as described above therefore achieves the preset aims thanks to an extremely simple and easy to use construction architecture.

15 The overall dimensions of the unit are reduced and allow it to be used in any type of environmental situation.

Very few structural variations to the dental unit are necessary and they do not require applications that cause inconvenience during and after assembly.

20 The accessories of the unit ensure a high degree of safety during its use over time with the possibility of varying the sanitising treatments to be carried out with just a few simple operations to replace the fluid container. The possibility of timing the treatments makes the unit equivalent in terms of quality to a system built into the dental unit from the outset and with acceptable costs.

25 The invention described can be subject to modifications and

variations without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.